tumn the publication of a series of educational monographs under the editorship of the president of the association, Dr. Butler. The papers will treat of various educational topics, historically and critically; and the most prominent educators, both in this country and in Europe, have promised contributions. It is expected that the first monograph will be from the pen of President Gilman of the Johns Hopkins university. The arguments in favor of industrial education and statements as to its proper organization and development will occupy a prominent place in the series, but not at all to the exclusion of other topics. We have heard both of these announcements with much pleasure, and particularly the latter, for it means that the teachers of the country will be able to obtain the opinions of responsible educators on current questions readily and at small cost. It is understood that this educational series will closely resemble in form and style the 'Historical studies' issued from the Johns Hopkins university, under Dr. H. B. Adams's editorship.

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An unexpectedly rapid growth in the numbers of students registering in the Cornell university for the Sibley college courses, in the past two years, and since their establishment on their present basis, has already crowded that institution to its utmost capacity in many directions, the number in the college having already approached, within twenty-five, that considered the maximum which can be accommodated in the existing buildings. A new building now in progress, under contracts made by the Hon. Hiram Sibley, and which will be presented to the university, will, however, increase the total space available next year by fifty per cent, and will bring the total number, as a maximum, when all classes are filled on the new basis, up to three hundred.

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## *DISTILLERY-MILK REPORT.*[1] — *III.*

In response to our circular, a number of letters of interest have been received, which we reproduce below: —

[Prof. H. P. Armsby, agricultural experiment-station, Madison, Wis.]

I do not think that there is any good evidence of any direct injurious effect of the swill upon the milk if used in a reasonably fresh state, and as a supplementary food; that is, as part of a properly compounded ration. Used too exclusively and in too large quantities, it is liable to produce disease in the cows, and thus to injure the milk. The great danger connected with the use of distillery swill, however, arises from the fact that it furnishes a most favorable medium for the growth of all sorts of micro-organisms. Unless the greatest care and cleanliness are observed about the stable, portions of the swill are almost certain to accumulate in out-of-the-way places, and serve as breeding-places of these organisms, whose spores contaminate the air of the stable, and almost necessarily infect the milk. While, therefore, I believe that milk of good quality, both as to composition and healthfulness, may be produced when distillery swill is fed, I question whether such will be its quality in the majority of cases: at least, there is always danger that it will not; and as regards that portion of the milk-supply of cities drawn from the small dairies in the outskirts and in the neighborhood of distilleries, which are often in the hands of ignorant and unscrupulous men, the danger is a very grave one. Two valuable papers in the *Milch Zeitung* for 1886 (Nos. 45 and 46) discuss the healthfulness of distillery swill quite fully: the first of them, by Professor Kirchner of Halle, takes substantially the ground that I have indicated above; the second, by a practical farmer, is more favorable to its use. These are all the references I have now at hand.

[E. L. Sturtevant, M.D., New York agricultural experiment-station, Geneva, N.Y.]

In response to your circular request of May 12, 1887, I would say that we have had no experience at the New York agricultural experiment-station with the feeding of distillery waste or distillery swill. In 1884, however, we had a very carefully planned and executed experiment upon the feeding of brewers' grains in an acid and putrefactive condition. The conclusions derived, while against injudicious feeding, were in no sense detrimental as regards the taste, flavor, appearance, keeping-quality, or composition of the milk, nor as between the hay-fed or the brewers'-grains-fed milk, nor as between the milk from the experimental cows and that yielded by the remaining cows of the herd, all of which is fully reported in our 'Third annual report,' pp. 49–59.

A further general experience with experimental feeding leads me to the belief that oftentimes the sanitary condition of the cattle under objectionable feeding has more to do with unhealthfulness in the milk-product than the actual food used. In support of this latter view, I would say that in 1869 I visited the dairy herds in the vicinity of Glasgow, Scotland. I found the prevalent custom among the farmers was to haul distillery swill daily to their farms, and to feed it to the milch-

[1] Continued from p. 581.

cows which furnished the milk-supply to the city. In the excellent sanitary condition of the cattle to whom this distillery slop was fed, we had a remarkable contrast to the asserted method of feeding in the stables attached to distilleries. At that time the milk-supply of Scotland was supposed to be of very superior quality as compared with that of ordinary city supplies; and I certainly could find no fault with the milk drank at the hotel tables, with that observed in the hands of the distributer, or with the milk observed in the byre at milking-time.

I may perhaps be allowed to assume to myself sufficient experience to be justified in offering the opinion that it is probable that a discussion of the sanitary surroundings of a herd is of more importance than that of the character of the food used, including in the term 'sanitary conditions' the effect upon the health of injudicious feeding. In support of this view, I would refer to experiments reported in the 'Fourth annual report of the New York agricultural experiment-station, for 1885,' pp. 16–34, wherein the adding of vinegar to food in condimental quantities was followed by increased appetite in the animals, and produced no observable detrimental effect upon the products. This conclusion is corroborated by various experiments with ensilage (always in an acid condition), wherein it was found that when ensilage was used in condimental quantities there was increase of appetite and no injurious effect upon product. On the other hand, when ensilage was fed exclusively, there was perhaps a detrimental effect to be observed upon nutrition, apparently coming from the inability to eat a sufficient food-supply, and no detrimental effect to be observed in the milk yielded.

My opportunities have not been such as to enable me to form a judgment in regard to the healthfulness of milk, for such data can only be obtained through actual trial and experience; but if testimony has any weight, the using of milk from distillery-fed animals, including in this term not only the food-supply but the unsanitary condition, must be extremely detrimental to health. We hence have offered in your questions two distinct problems: 1. The practical problem concerning the use of distillery waste as used in connection with unsanitary conditions; 2. The scientific problem as to whether this assumed injurious condition of the milk is derived primarily from the food, or from the conditions under which the food is fed, including the problem of injudicious feeding.

[H. C. DUNAVANT, M.D.]

My opinion, based on chemical and physiological reasoning, is, that swill-fed cows could not give wholesome food in the way of milk.

[S. W. ABBOTT, M.D., secretary Massachusetts state board of health, Boston, Mass.]

Chemical analyses will not settle the question. There can be no doubt that milk may be produced which is unfit for use, and at the same time may contain an unusually large amount of milk solids. Experiments in Hamburg in regard to the milk-supply from certain model stables or dairies have shown this to be true. My opinion as to the wholesomeness of distillery swill as food for cows is that it is bad. The principal nutritious portion of the grain has already been withdrawn for the purpose of supplying the necessary elements for conversion into alcohol in the product of the distillery, and the cows are thus defrauded of that which is their natural food.

*Analyses.*

In answer to the question, What analyses can you give of milk obtained from cows fed on distillery swill? the following replies were received: —

[S. RATTON PERCY, M.D., New York academy of medicine, 1858.]

| | From one of the fattest cows in a distillery stable. | From mixed milk of 4 cows just after milking. | From same stable; milk taken from cans. | From another stable; milk from cans. | From another stable; milk from 4 cows just after milking. |
|---|---|---|---|---|---|
| Solid particles..... | 142.0 | 130.0 | 131.0 | 132.0 | 133.0 |
| Water..... | 858.0 | 870.0 | 869.0 | 868.0 | 867.0 |
| Butter..... | 44.0 | 35.0 | 31.0 | 30.0 | 34.0 |
| Sugar..... | 18.0 | 15.0 | 17.0 | 18.0 | 18.0 |
| Caseine, or curd.. | 66.0 | 68.0 | 70.0 | 70.0 | 69.0 |
| Saline matters.... | 14.0 | 12.0 | 13.0 | 14.0 | 12.0 |
| | 1000.0 | 1000.0 | 1000.0 | 1000.0 | 1000.0 |

[Professor SIMON, Baltimore, Md.]

Of many samples of milk examined, I will give here the average result of six samples; specific gravity, 1.029: —

| | |
|---|---|
| Fat..... | 3.77 |
| Caseine..... | 4.44 |
| Milk-sugar..... | 4.56 |
| Ash..... | 0.76 |
| Water..... | 86.47 |
| | 100.00 |

[Professor Doremus.]

| | |
|---|---|
| Solid particles | 141.4 |
| Water | 858.6 |
| Butter | 44.2 |
| Sugar | 17.9 |
| Caseine | 70.8 |
| Saline matters | 8.5 |
| | 1000.0 |

[E. H. Bartley, M.D.]

Milk from two cows at the Blissville swill-stables in 1879, obtained by myself and personally analyzed, gave the following results : —

| I. | | II. | |
|---|---|---|---|
| Water | 89.21 | Water | 89.14 |
| Fat | 1.37 | Fat | 1.23 |
| Sugar } Caseine } | 8.80 | Sugar } Caseine } | 8.95 |
| Ash | .62 | Ash | .68 |
| | 100.00 | | 100.00 |

Not more than five per cent of thin cream by volume in either specimen ; reaction acid ; under microscope, fat-globules scant, small, and aggregated ; some colostrum-like cells and particles of epithelium.

*Sanitary ordinances.*

From the answers received, it appears that sanitary ordinances exist in Brooklyn, section 45 of Sanitary code, and in New York, sections 29, 45, 186, and 207 of Code, prohibiting the feeding of distillery swill to milch cows, and the sale of milk from animals so fed. In New York state the same practices are prohibited by chapters 202, Laws of 1884, and 183 of Laws of 1885. In New Jersey, chapter 82, Laws of 1882, prohibits substantially the same. There is said to be a prohibitory law to the same effect in Illinois. The sale of milk from cows confined in distillery sheds, and fed on distillery slops, is prohibited in Chicago. In Massachusetts the sale of milk from cows fed on the refuse of distilleries is prohibited (Chapter 57, sections 5 and 9, of the Public statutes of Massachusetts, as amended by chapter 318 of the Acts of 1886).

[*To be continued.*]

## EXPLORATION AND TRAVEL.

*Asia.*

Messrs. Bonvalot and Capus, who are making an attempt to reach India, starting from Fergana, by way of the Alai Mountains and the Pamir Plateau, had reached on March 15 (*Bull. soc. géogr.*, No. 10) the pass of Taldyk, a few days' journey north of Kara-Kul, which is situated in the northern part of the Pamir. Their journey is considered extremely difficult, on account of the severity of the climate, the hostility of the natives, and the difficult roads.

Mr. Carey has continued his interesting journeys in Central Asia. The latter part of the winter of 1885–86 he spent in Chelik, near Lob-Nor. About May 1 he went south, in order to explore the northern part of Tibet. For this purpose he had to cross the Altin Tag and Chamen Tag. Having passed these ranges, he reached the foot of a high chain, which is probably the true Kuen Luen. Here his guides failed to find a pass by which it was possible to cross so early in the season, and he had to travel a considerable distance eastward, through barren and difficult country, until at length an opening was found leading to the valley of the Ma Chu, the head source of the Yang-tse-kiang, which was visited by Prejevalsky in 1879. Want of supplies compelled him to turn north, and he spent some time exploring the district of Tsaidam, which is situated between the Altin Tag and Marco Polo range. In the autumn he struck north, and, after crossing the Gobi, reached Urumchi in the Tien Shan, now the capital of Chinese Turkestan. Here he was well received by the Chinese governor, and despatched to Yarkand, where he arrived early in the present year, and whence a start was made on March 7 for Ladak. It appears that he went chiefly over Prejevalsky's ground. The high chain south of the Chamen Tag, reached by him, are the Columbus and Marco Polo mountains of Prejevalsky. His journeys in Tsaidam are new, while on his way north he followed Prejevalsky's route. The results of this journey, nevertheless, will be of great importance.

*Africa.*

The *Scottish geographical magazine* for June contains an interesting account of an exploring trip to Mvutan Nsige by Emin Pasha. His remarks on the formation of the lake are of great interest. He describes the mountain-ranges bordering it, and the alluvial deposits on its western coast. Land is forming rapidly on the west side of the lake, it appears, while the mountains on the east side rise steeply from the water. The lake is described as very stormy, the winds blowing with great force up and down the valley. Emin has made two other excursions on the lake since this paper was written ; and the following extracts from a letter, which are published as an appendix to the paper, give the chief results of his work. He writes, "The chief result of my work is the